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ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XXXI. JUNE, 1920. NO. 6.

CONTENTS

Skinner—The Genus Pyrrhocalles Mabille with the Description of a New Form (Lep., Hesperidae)..... 151
Crampton—Remarks on Dr. MacGillivray's Paper entitled "The Eyes of Insects"..... 153
Goding—The Known Membracidae of Ecuador (Homop.)..... 155
Marchand—Thermotropism in Insects 159
Chamberlin—The Spider of Saltair Beach (Arach., Aran.)..... 165
Ainslee—Notes on Gonatopus ombrodes, a Parasite of Jassids (Hymen,. Homop.)..... 169
Editorial—Entomology in the United States National Museum..... 174
New Chief of Bureau in New Jersey.... 174
The Louisiana Entomological Society.. 175
Skinner—A New Variety of Lemonias (Lepid.)..... 175
Skinner—Pamphila californica (Lepid.) 175
Banks—A Rare Pamphlet (Hym., Lep., Neur.)..... 176
Schaus—Synonymy of Some Species of Thecla (Lepid.)..... 176
Entomological Literature..... 177
Obituary—Franklin Dye..... 180

The Genus Pyrrhocalles Mabille with the Description of a New Form (Lepidoptera, Hesperidae.)

By HENRY SKINNER, Philadelphia.

The genus *Pyrrhocalles* was described in the Genera Insectorum (Hesperidae) in 1904. The only species mentioned is *Pamphila antiqua* Herrich-Schaffer and the localities given are the islands of Cuba and Haiti in the West Indies. We have in the collection of The Academy of Natural Sciences of Philadelphia three forms: one from Haiti and San Domingo, one from Cuba, and one from Jamaica. The insect from Jamaica was described by Mr. William Schaus as *Phemiades jamaicensis*.*

This is a perfectly good species and shows no tendency to gradation. We have four specimens of a *Pyrrhocalles* from eastern Cuba which I have always taken to be *antiqua* Herr.-

* Proc. U. S. Natl. Museum, 1902, 24, 440.

Schaff., but they do not agree with the description of *antiqua*. The description of *antiqua* agrees perfectly with the specimens from Haiti, and Mr. Schaus suggests that Herrich-Schaffer may have had a Haitian specimen before him when he described *antiqua*. Mr. Schaus also says that his Cuban specimens all lack the small spots on the primaries and I think all his specimens were probably collected by himself in the Santiago region (Oriente). I have never seen any species of *Pyrrhocalles* from Porto Rico and I do not know whether there are any on that Island. Dr. C. T. Ramsden has a fine collection of Cuban Lepidoptera, and I wrote to him for information in regard to *antiqua*. His reply follows:

"My specimens certainly have not the spots you have drawn as on the San Domingo specimens, but mine are all from the environs of Guantanamo. Possibly those from western Cuba may have the spots. The question is to get some from western Cuba and I shall try to get them. The Herrich-Schaffer type may have come from around Havana as Gundlach did his first collecting in and about Matanzas Province. It is strange that Gundlach (Cont. Entomologia Cubana) does mention these spots, and probably did have a Cuban specimen before him. I have always been in doubt whether Gundlach made his descriptions from specimens before him and taken by himself, or whether he copied the Herrich-Schaffer descriptions. I am inclined to think, however, that he made his own descriptions from material before him. His descriptions in some cases are not quite complete, or at least not as complete as one should desire. I have never detected a mistake, nor noticed any kind of nature-faking. I notice he says he found the species only in western Cuba."

To try and clear up the matter for the present I propose the name **orientis** for the unspotted form found in eastern Cuba. The *type* is a male from Guantanamo (San Carlos ?), Cuba, taken June 25, 1910, for which I am indebted to Dr. Ramsden, in the collection of The Academy of Natural Sciences of Philadelphia.

It will probably be useful to have the original descriptions as the works in which they are contained are not commonly in libraries.

"*Pamphila antiqua* HS. One of the largest species, though with narrower wings than *statius*. Black brown, all wings as far as about the middle beautiful cinnamon-red, which color is finely divided by black ribs, on the anterior wing as far as branch 3 and on the back wing everywhere reaching

over the middle, in cell 3–7 of the primaries forms a bow-shaped row of little spots, on its costal half, however, reaches only to the middle of the wing. Underneath the ground-color lighter, and the wing strongly covered with cinnamon-colored scales, a bow-shaped row of still lighter spots behind the middle, one such spot on the middle. The spots of the under side lighter and larger than above."† [Translation.]

Dr. Ramsden kindly sent me the description of *antiqua* by Gundlach.

"Up to the present this species is known only from the Island of Cuba, western part. I do not know the larva or the chrysalis. I do not see any marked difference in the coloring of each sex. The insect is rare and visits the flowers. On the upper side the four wings are brown (dark brown), with their basal half of a pretty reddish cinnamon and a transverse line of spots of the same color on the anterior wings. Under side of anterior wings are dark brown with a band of spots which correspond to those on the upper side, this band of spots begins at the base of the anterior border then separating from it in a circle till it nearly reaches the anterior border. The posterior wings below are of ferruginous brown color with an arc-shaped series of cinnamon colored spots, as also a single central spot of this same color, all of which are barely visible. Between the wings 50 mm."§ [Translation.]

The Jamaican species is readily separated by the difference in the markings on the upper side of the secondaries. In the Cuban and Haitian forms the black color does not extend into the cinnamon color of the central area of the wing.

Remarks on Dr. MacGillivray's Paper entitled "The Eyes of Insects."

By G. C. CRAMPTON, PH.D., Massachusetts Agricultural College, Amherst, Mass.

In a class of animals like the Insecta, which includes such a diverse and multitudinous array of forms ranging from the extremely ancient and primitive types to the more recent and highly modified ones, it is extremely difficult to discover any features which are peculiar to one of the larger subdivisions of the class, and which are characteristic of all of its members without exception. Although it may be much simpler to ignore these exceptions when they occur only in a few scattered

† Corresp. Blatt Regensb. 1863, 17, p. 142.

§ Gundlach, Entomologia Cubana, 1881, p. 150.

instances, on the other hand, when such exceptions occur quite constantly throughout the members of an entire order, or similar larger subdivision of a group of insects, these exceptions become of sufficient importance to merit a reference to them, especially in an article intended for general reference, such as Dr. MacGillivray's paper on "The Eyes of Insects."* I would therefore call attention to one or two statements in Dr. MacGillivray's article which might be misleading to anyone not familiar with the subject, although the main points of the article are quite correct, and are well taken.

Dr. MacGillivray's claim that "the developing compound eyes of the adult can frequently be seen in the pupa of entometabolous insects and rarely in their larvae, but these stages are never provided with functional compound eyes" would appear to be too sweeping a statement, since exceptions to this rule occur quite constantly throughout the members of an entire order of insects, and a few scattered instances are to be found in other orders. Thus, all known larvae of insects belonging to the order Mecoptera have functional compound eyes, and in full-grown larvae of certain corethrid Diptera the compound eyes are so large and well-developed that it is difficult to believe that they are not functional.

It is evident that Dr. MacGillivray means *functional* ocelli when he states that ocelli are present "only in the adults of exometabolous and entometabolous insects," but when one examines the ocelli of a young grasshopper, for example, they appear to be quite as capable of functioning as those of the adult. While it is possible that the statement that "functional ocelli are never present in nymphs, larvae, or pupae" may be correct, it would have been much more convincing if some proof had been presented in support of this view. As was mentioned above, the ocelli of a grasshopper nymph have every appearance of being as capable of functioning as those of the adult, and it is difficult to believe that the ocelli of full-grown nymphs of our larger Plecoptera, certain mayflies, etc., are wholly functionless. The ocelli of the latter forms are quite large, and would appear to be capable of distinguishing light from darkness—which is the function as-

* Ent. News, xxi, 97–100, April, 1920.

cribed to the ocelli of adult insects (in addition to the function of distinguishing objects close at hand)—and if the ocelli of these nymphs are wholly functionless, the fact should be brought out by experiment before it is stated as though it had been conclusively proven.

Dr. MacGillivray's statement that "Ocelli are never present in ametabolous insects" appears to be entirely too sweeping. All of the insects belonging to the ametabolous group Machiloidea (which is considered as an order by many entomologists) appear to have exceptionally large and well developed ocelli. In fact, the ocelli of these insects are proportionately much larger than those of any other insects I know of, so that Dr. MacGillivray's statement in this matter can be accepted only with reservations.*

In calling attention to these exceptions to the general statements made in Dr. MacGillivray's paper, I would not minimize the value of the principal points brought out in his article, since in the main these points are quite correct, and are well taken. On the other hand, the exceptions to his general statements are in some cases of sufficient importance to merit mention, and should therefore be called to the attention of students who are referred to Dr. MacGillivray's paper in their general reading, or of anyone who contemplates making a much-needed study of the different types of eyes found among insects.

The known Membracidae of Ecuador (Homop.)

By Dr. Frederick W. Goding, Guayaquil, Ecuador.

(*Continued from page 136*)

***Triquetra inermis** Fairm. Rev. Mem. p. 280. *Hab.:* Province of El Oriente, (Goodfellow); Macas, Province of Chimborazo, (Feyer).

***Triquetra obtusa** Fowl. Tr. Ent. Soc. Lond. (1894), p. 417. *Hab.:* Province of El Oriente, (Goodfellow).

* In many ametabolous insects, as Dr. MacGillivray points out, simple eyes occur in the position which compound eyes occupy when present in higher insects. In the ametabolous group Machiloidea, however, there are well-developed compound eyes of the normal type, and in addition to these, the Machiloidea have three ocelli located on the frontal region as in higher insects.

*Triquetra grossa Fairm. Rev. Mem. p. 280. *Hab.:* Province of El Oriente, (Goodfellow).

*Triquetra virgata Fairm. Rev. Mem. p. 282. *Hab.:* Normandie, Province of El Oriente, (Feyer).

*Triquetra angustata Fairm Rev. Mem. p. 282. *Hab.:* Normandie, Province of El Oriente, (Feyer).

*Triquetra ustulata Fairm. Rev. Mem. p. 281. *Hab.:* Normandie, Province of El Oriente, (Feyer).

*Umbonia erecta n. sp. (See description on another page.) *Hab.:* Mangorisa River, Province of El Oriente, (Feyer).

*Umbonia ataliba Fairm. Rev. Mem. p. 278. *Hab.:* Canelas, Puyo, Province of El Oriente, (Feyer).

*Umbonia spinosa Fabr. Syst. Ent. p. 675. *Hab.:* Machala, Province of El Oro, (Rorer); Normandie, Province of El Oriente, (Feyer).

*Hoplophora gigantea Fairm. Rev. Mem. p. 269. *Hab.:* Province of El Oriente, (Goodfellow).

*Hoplophora vicina Fairm. Rev. Mem. p. 270. *Hab.:* Quito, Province of Pichincha, (Walker); Cuenca, Province of Azuay, (Pachano); Province of El Oriente, (Goodfellow).

MEMBRACINAE.

*Membracis jessica n. sp. (See description on another page.) *Hab.:* Canelas, Province of El Oriente; Lliquino, Province of Tungurahua; Yaruquies, Province of Chimborazo, (Feyer).

*Membracis mexicana Guer. Icon. Reg. Anim. p. 364, pl. 59, f. 1. *Hab.:* Machala, Province of El Oro., (Rorer).

*Membracis tectigera Oliv. Enc. Meth. vii, p. 668. *Hab.:* Mangorisa River, Canelas, Province of El Oriente, (Feyer).

*Enchenopa ignidorsum Walk. List Hom. Brit. Mus., Suppl. p. 124. *Hab.:* Machala, Province of El Oro, (Rorer).

*Sphongophorus ballista Germ. Silb. Rev. Ent. iii, p. 231. *Hab.:* Quevedo, Province of Los Rios, (Campos).

*Bolbonota pictipennis Fairm. Rev. Mem. p. 258. *Hab.:* Machala, Province of El Oro, (Rorer).

*Guayaquila roreriana n. sp. and gen. (See description on another page.) *Hab.:* Machala, Province of El Oro, (Rorer).

DESCRIPTIONS OF NEW ECUADORIAN MEMBRACIDAE.

Centrogonia flavo-limbata n. sp.

Black, roughly punctured, furnished with numerous strong black hairs. Head black, with two short vertical lines above middle, a longer line reaching apex, a small dot near each eye, lateral borders and a dot on each side of apex bright yellow; eyes prominent, pale yellow. Pronotum with dorsum convex in front and lightly sinuate posteriorly, apex deflexed; posterior process reaching tip of abdomen, lengthily deeply and broadly

compressed on each side from humeral angles halfway to apex; furnished with a strong percurrent median carina; a small tubercle and spot behind each eye, anterior border and a dot on each side just above it, a spot above each humeral angle, anterior two-thirds of lateral borders, and apex, yellow; elsewhere obscurely yellow mottled. Below, the chest and abdomen, femora except apices, black; apices of femora, and tibiae except apices sordid yellow; apices of tibiae, and the tarsi brown. Long. 5 mm.; lat. 2 mm.

Habitat: Pifo, Province of Pichincha, 2,588 meters, (Campos). Described from one female.

Differs from its congeners by the black color, yellow lateral borders, and strong percurrent carina. The apical fourth of the tegmina is wanting.

ECUATORIANA n. gen.

Ocelli equi-distant from the eyes and each other. Dorsum of pronotum moderately elevated, with numerous irregular longitudinal carinae, and bearing two large more or less quadrangular elevations, the first just behind humeral angles, the second at middle; humeral angles developed into large flat auricular processes; posterior process covering clavus and a small part of corium. Tegmina with distinct veins; basal half of corium coriaceous and punctured, emitting three longitudinal veins equi-distant from each other and costa, space between interior ulnar vein and interior border occupying half its area, third apical cell triangular, petiolate, one discoidal cell. Wings with four apical cells, second subtriangular, petiolate, third long, broad, sessile. Tibiae not broadened; tarsi of equal length.

The venation is nearly identical with that of *Oxygonia chrysura* Fairm., while the general facies is that of a *Telemona*.

Genotype: Ecuatoriana bactriana n. sp.

Ecuatoriana bactriana n. sp.

Black, mottled with yellow, pronotum with numerous irregular longitudinal carinae and others passing to the superior border of dorsal elevations; median longitudinal carina strong, percurrent. Head triangular, apex lightly produced. Pronotum convex in front; dorsal elevations with superior borders lightly rounded, front and hind borders perpendicular the latter of the second elevation lightly sinuate; sinus between ele-

vations about equal in size to the second; apex reaching tips of tegmina; anterior third of lateral borders, a broad band behind second dorsal elevation and other irregular marks, yellow. Tegmina with basal half of corium black mottled with yellow, extremities including first four apical cells smoky, fifth cell large, subtriangular; discoidal cells long, very narrow, base formed by a transverse venule between ulnar veins before middle, apex suddenly enlarged and curved to reach fifth apical cell. Below black, tarsi pale. Long. 10 mm.; lat. inter hum. 6 mm.; altitude of elevations 5 mm.

Habitat: Zuñas, Province of Chimborazo, 2,000 meters, (Feyer). Described from one female.

Tomogonia camposiana n. sp.

Head entirely yellow, eyes prominent, pearly color. Front half of pronotum bright yellow except as follows: two spots above each eye, humeral horns, a broad stripe passing from humeral angles above lateral borders for one-third their length, a broad longitudinal median stripe originating some distance from base of pronotum, and posterior half of posterior pronotal process, shining black; lateral borders from humeral angles half way to apex broadly pale yellow; apex far surpassing tip of abdomen, but not quite reaching apices of tegmina. Tegmina transparent yellow, with a broad stripe extending from base to apex of corium, interior border of clavus, and nearly all of apical cells nearly black. Wings with four apical cells, second small, sessile, fourth very small. Body below yellow, sides of abdomen splashed with fuscous; ovipositor black; legs yellow, tips of posterior tibiae and of tarsi black. Long. 10 mm.; lat. inter hum. 5 mm.

Habitat: Posorja, Province of Guayas, (Campos). Described from three females. This species is nearest to *vittatipennis* Fairm., from Guatemala.

Named in honor of Prof. Francisco Campos R.

Umbonia erecta n. sp.

Very similar to *ataliba* Fairm., from which it differs in the median and lateral lines being black none of which pass to apex of dorsal horn which is reddish testaceous; the dorsal horn is long, very slender and erect and placed behind humeral angles. Tegmina pitchy at base, with all longitudinal veins piceous, cells transparent yellow, apex of corium darker. Femora and tibiae testaceous, the latter with a fuscous stripe. Otherwise as in *ataliba*. Long. 15 mm.; lat. inter hum. 8 mm.; alt. cornu. 7 mm.

Habitat: Rio Mangorisa, Province of El Oriente, (Feyer). Described from two slightly mutilated females.

Membracis jessica n. sp.

Nearly identical in form and size with *foliata*, from which it differs in being yellow with a broad vertical band extending from lateral angles to middle of dorsum, and a large quadrangular spot before apex of posterior process, sooty black. Long. 15 mm.; alt. 8 mm.

Habitat: Canelos, Lliquino, and Yaruquies, Province of El Oriente, (Feyer). Described from four females.

Dedicated to the memory of my wife, one of the victims of yellow fever.

GUAYAQUILA n. gen.

Pronotum armed with a compressed porrect horn in front, destitute of lateral carinae but with a percurrent median carina; dorsum flat, broad at humeral angles, gradually attenuated to an obtuse apex which reaches tip of abdomen, but shorter than apices of tegmina. Generally golden silky pubescent. Tegmina similar in shape and venation to those seen in the genus *Membracis*. Wings with four apical cells, second broad and quadrangular, fourth minute. Front and middle tibiae broadly dilated, short; posterior legs three times the length of front legs, hind tibiae with strong sharp spines. Facies of *Aconophora*.

Genotype: Guayaquila roreriana n. sp.

Guayaquila roreriana n. sp.

Uniform cinnamon brown, silky pubescent. Front horn with a compressed broad edge, not pointed but rounded at apex, convex between superior and inferior borders longitudinally, with a median longitudinal carina, but destitute of lateral carinae. Tegmina semi-opaque uniform brown. Body below brown, posterior edges of abdominal segments and anal segment paler. Tibiae testaceous, spines of hind tibiae black. Long 9 mm.; lat. 3 mm.

Habitat: Machala, Province of El Oro, (Rorer). Described from one male of which the head is wanting.

This species is named in honor of Prof. J. B. Rorer.

I desire to express my gratitude to Professors Campos, Rorer and Pachano, and Messrs. Goodfellow and Feyer for a multitude of favors in my endeavor to make the entomology of Ecuador better known.

Thermotropism in Insects.

By WERNER MARCHAND, New York City.

While the phenomena of helio- and phototropism have been extensively studied, concerning thermotropic reactions we have practically no data. The consequences of uneven

heating on the plasmodia of Myxomycetes have been studied by Stahl (1884), who observed that the plasmodia will move when opportunity is offered, from water of 7°C. to water of 30°. In accordance with this reaction, the plasmodia of *Fuligo septica* will migrate in the fall, in consequence of the cooling of the air, several feet deep into the warmer layers of the tan bark where it hibernates. In the spring the movement is in the opposite direction, towards the now more strongly heated superficial layers.

For protoza, M. Mendelssohn (1895, 1902 *a*, *b*) has described, under the name of Thermotropism, the observation that *Paramecia* gather at a definite end of a trough when these ends have different temperatures. In the words of J. Loeb (1918): "the organisms were put into a flat trough resting on tubes through which water was flowing. When the water in the tube had a temperature of 38° at one end of the trough, while the tube at the opposite end was perfused by water of 26° the organisms all gathered at the latter end. If then the temperature of the water in the two tubes was reversed the organisms went to the other end of the trough. If one end had the temperature of 10°, the other of 25°, all went to the latter end." Mendelssohn's observations form the only case of thermotropism mentioned by Jennings (1906) and by Loeb. The latter author is of the opinion that in this case we are in all probability not dealing with a tropistic reaction but with a collecting of organisms due to the mechanism of motion described for *Paramecium* by Jennings. When these organisms come suddenly from a region of moderate temperature to one of lower temperature, the activity of their cilia is transitorily reversed, but owing to the asymmetrical arrangement of their cilia they do not go back in the old direction but deviate to one side. This can lead to a collecting of *Paramecia* such as Mendelssohn described.

No cases of thermotropism in higher organisms are mentioned by recent authors, and this should seem astonishing, since the effect of changing temperatures must be universal and ubiquitous. However, a tropistic action of heat upon the organism may be obscured by the direct action of temperature upon all life-processes.

Among insects, cockroaches are known to prefer warm places, and so undoubtedly do numerous other insects. In fact, an attraction by heat must be quite general, and is probably found at the bottom of such instincts as that of ants to bring their offspring to the surface of the earth when the stone covering the colony is heated by the sun's rays. Subterranean larvae also probably move upward and downward with regard to temperature. While roaches and domestic crickets seek the heat of the stove, the field crickets, ground beetles, etc., are found in places exposed to the full sunlight. Hairy caterpillars, like those of *Malacosoma*, seek the sunshine and apparently derive advantages from being heated by the sun's rays, but whether they are attracted by a purely thermal stimulus is doubtful (Howlett, 1910).

Graber (1882), to whom we owe so many fundamental observations concerning the function of sense-organs in lower animals, seems also to be the first to have noticed temperature reactions of insects. According to this author, who experimented with the cockroach *Blatta germanica*, the antennae of *Blatta* are more sensitive to certain extremes of temperature than are, for instance, the lips and finger-tips of man, which are the most sensitive parts of the human body as regards temperature.

If a specimen of the *Blatta* is blinded previously to the experiment, and then its antenna approached with a red-hot needle or with the point of a very cold object, the stimuli thus afforded will produce an effect even at a distance from which the human skin does not perceive any sensation, the effect on the animal being that the affected antenna is withdrawn.

Graber's observations show that there is in certain insects a highly developed sense of temperature, but the behavior of *Blatta* in his experiments cannot be called a tropism in the ordinary sense, which would involve oriented movements in which the orientation of the animal is affected by its reactions.

Observations on what appeared to be a negative thermotropism, were made by the writer (Marchand, 1917) on the

wingless Tipulid or snow-fly, *Chionea alpina* Bezzi, an insect which habitually lives on the snow, the species in question in the high mountains of Switzerland. If *Chionea* was kept in a glass tray, about one and one-half feet long, and covered with wire netting and with two glass-plates in such a way that the middle portion, at least one third of the whole length, was covered only by wire netting, the two ends in addition by the glass plates, and if the cage was oriented so that one end of the trough was directed towards the open air (of a porch) at about freezing temperature, the other end towards the heated room, the insect would come to rest at the underside of the free portion of the wire netting and at the extreme border of this free portion in the direction of the open air. Inasfar as it refused to go under the glass plate, positive phototropism (heliotropism) seemed to be excluded. If the cage was turned 180° the insect assumed the corresponding position on the other side of the tray. In addition, it could be observed that *Chionea* avoided the approaching finger at some distance, and that this effect could be increased if the hand was heated by means of an electric light bulb. In this case, the insect could be driven, by merely approaching it with the hand, under the glass-plate-covered portion of the tray. The negative thermotropism seemed stronger in the light than in the shade. If the animal was running over the snow, approaching it with the finger was sufficient to cause it to change its course but in this case an optic reaction is not excluded.

More characteristic cases of thermotropism are found among mosquitoes. Concerning mosquitoes, Howlett (1910) was the first to observe a positive thermotropism as underlying the biting instinct. This observer carried out a series of preliminary experiments and found that shed blood or human sweat did not attract the females of *Culex fatigans* or *Stegomyia scutellaris* any more than water. On experimenting with the effects of heat, however, it was at once found that the females of *Stegomyia scutellaris* were readily attracted by the hot air radiating from a test-tube containing hot water; the male mosquitoes, on the contrary, paid no attention to it.

As a result of a number of similar experiments he concludes that (*a*) the bite of a mosquito is a reaction to the stimulus provided by a hot surface, (*b*) that the mosquito is attracted to the hot surface mainly by the warm air rising from it, and (*c*) that the strength of the reaction is, within certain limits, proportional to the differential temperature of the surface, *i. e.*, the difference between its temperature and the general air temperature at the time, and that this difference must be positive.

Howlett's experiments were not known to the writer when in the fall of 1915 some observations were made on mosquitoes of the species *Anopheles punctipennis* Say, which confirm the results obtained by Howlett in *Stegomyia*, and render it probable that the basic tropism underlying the bloodsucking instinct is a thermotropism (Marchand, 1918). If female adults of *A. punctipennis* were placed in a lamp-chimney which on one end was closed by a covering made of cheese-cloth, and at the other end was brought in contact with a heated glass-plate, with a sheet of filter paper between serving as a foothold, the mosquitoes were seen immediately to go to that end of the lamp-chimney where the glass plate was and to alight on the filter paper. Here they began to attack the surface with their probosces, trying to bite through the glass plate. In fact they could be seen bending their probosces as a result of their strong efforts to pierce the surface. They consequently reacted to the heated glass-plate in the same way as if it were the skin of a vertebrate host. This experiment was repeated with different sets of mosquitoes, usually five or six at a time, and always with the same result. The number of specimens refusing to attack the glass-plate seemed not greater than that usually observed of specimens refusing to accept blood food when offered. Males showed the same reaction but much less strongly; in this respect my observation differs from Howlett's. Male *Anopheles* are also slightly attracted by human skin but are not able to pierce it. On the other hand, hibernating females of *Culex* did not show even a trace of this thermotropic reaction. These mosquitoes, however, also persistently refused to take

blood food. This fact is of some interest when compared with the behavior of *Chionea*. While *Chionea* as a winter insect is normally negatively thermotropic, in the mosquitoes the thermotropic reaction appears to be absent in the winter months, when the insects cannot fly about and therefore cannot obtain blood food. More observations, however, are necessary to gain a complete insight into these phenomena.

Concerning other bloodsucking insects, so far no data are available. Hog lice, *Haematopinus suis*, failed to give a thermotropic reaction but this appears not astonishing since these insects live permanently on their host, and being wingless, would hardly be able to find the host by means of a tropism.

A distinction should be made between a mere aggregation of insects in a definite temperature-optimum and a true thermotropism in which there is an oriented movement in the direction of the source of heat, or away from it. Olive C. Lodge (1918), found that house flies will congregate around a Bunsen burner in a definite circle, the size of which varied according to the distribution of the heat. This was tested by placing larger or smaller pieces of asbestos over the flame, when the flies arranged themselves in larger or smaller circles respectively. The temperature of these circles was very constant, varying between 42 and 44°C. If the gas was turned off the flies came nearer the burner and climbed up the stem of it, but when it was no longer warm they dispersed in all directions. Heated baits were visited most frequently when their temperature was at 38–48°C. The impression is gained that the flies prefer a definite optimum of temperature, but it remains to be seen whether there is any specific reaction to heat, as is apparently the case in the mosquitoes.

The problem, what particular sense-organs of the thermotropic insects are affected by the radiation of heat from objects producing the reaction, seems not yet entirely solved. According to Graber (1882), whose experiments were mentioned, the sense of heat (Wärmesinn) is developed, at least in *Blatta*, chiefly in the antennae, and to a lesser degree in the cerci (Analborsten). The functional interpretation of the well-known specific nerve endings of the antennae has there-

fore to reckon with the fact, that these appendages are not only organs of the tactile and olfactory sense but also of the sense of heat perception. It may be of interest in this connection that, at the moment of biting, the *Anopheles* mosquito will lift the two long palpi at right angles to the proboscis; these might be supposed to be the seat of heat-perception but according to Graber the function of the palpi is olfactory and this even to a higher degree than in the antennae.

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The Spider of Saltair Beach (Arach., Aran.)

By RALPH V. CHAMBERLIN, Cambridge, Massachusetts.

About ten years ago the newspapers of Salt Lake City gave considerable space to accounts of what was characterized as "a plague of spiders" at the Saltair Beach resort, Great Salt Lake. At that time spiders were recorded as occurring

in countless numbers in and over all the buildings at the resort, stretching their webs on every available support. Each morning the attendants, armed with brooms, would endeavor to clear the webs and spiders from the dressing-rooms and other more used parts of the buildings; and each succeeding morning webs and spiders had reappeared as if by magic. The pavilion at this resort stands over the water on piles a considerable distance from shore; and the extensive spaces beneath the floor of the pavilion and on the piling in general harbored a seemingly inexhaustible supply of spiders which each night swarmed over the buildings, seeking unoccupied sites for their webs. For a year or two the plan of gathering and destroying the cocoons late in the season was tried in an effort to rid the place of the pest. Cocoons by the bushel were gathered by the attendants working systematically in and about the building and from boats beneath the pavilion. This is said to have relieved the situation. Evidently, however, the efforts were later abandoned; for, upon visiting the beach in 1918 and again in 1919, I found the spiders holding undisputed sway in their wonted places, they and their webs occurring everywhere. People have apparently become used to the sight and correspondingly tolerant of these feared but inoffensive creatures.

It is popularly believed that several kinds of spiders occur at Saltair, but I observed only one. Of this I collected several hundred specimens. In this species the males, as often, are formed differently from the females, are of a much lighter color, and would, by the layman, naturally be regarded as a distinct kind. The light abdominal markings, normally yellowish in color, are not uncommonly bright red, particularly in the males, giving thus the "red spider," commonly accounted as a third kind, which an employee at the beach assured me was especially dangerous!

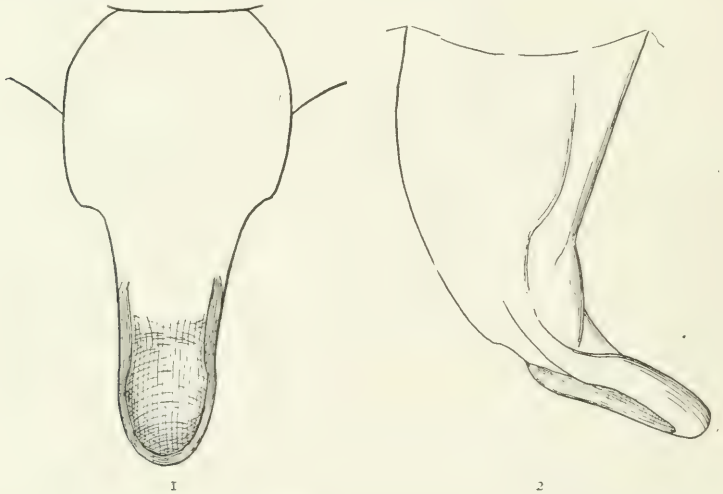
The spider is one of the orb-web weavers (Argiopidae), and belongs to the genus *Neoscona*, commonly included in *Aranea*. the *Epeira* of most earlier writers. In *Neoscona* it falls in the group in which the males have the coxae of the fourth legs armed beneath with a conical process. Hereto-

fore this group was known to include but two, or perhaps three, American species, namely *oaxacensis* (Keyserling) of Mexico and Central America and *vertebrata* (McCook) of the southwestern United States. In the *Biologia Centrali-Americana* F. O. Picard-Cambridge describes a species *conifera* from Mexico and Central America, and places *vertebrata* in synonomy with *oaxacensis;* but a study of material from the type locality of *vertebrata* (San Diego, California) and elsewhere in the southwest shows that *vertebrata* agrees in all details except in size with *conifera* as described by the author mentioned, and differs correspondingly from *oaxacensis*. *Conifera* is thus probably a synonym of *vertebrata*. The Saltair Beach spider is close in general structure to these forms; but it is an obviously distinct species, and one which seems never to have been named. It is a much more darkly colored species than *vertebrata*, with relatively longer legs, and differs in structural details as indicated in the description below. Thus far it has not been taken anywhere excepting at the Saltair Beach. The types of this species are in the collection of the Museum of Comparative Zoology, Cambridge, Massachusetts.

Neoscona salaeria sp. nov.

♀.—Adult females in full color have the integument of carapace and legs from mahogany to black, without any distinct markings. Sternum black with a narrow median longitudinal stripe of yellow. Labium and endites black with anterior and mesal borders, respectively, pale. The carapace and sternum clothed with gray hair, the legs with gray and brown hairs. Abdomen in general blackish, showing above a narrow median longitudinal stripe, much as in *oaxacensis*, formed by numerous small yellow dots but with no spots or marks of yellow as large as those occurring in *vertebrata* or *oaxacensis;* on the lateral parts of the dorsum, especially anteriorly, similar small yellow dots may occur in varying numbers, the median stripe sometimes dissolving in a larger anterior area formed by such dots. Very often the dorsal yellow markings are almost wholly obliterated. Venter with four yellow spots, two just caudad of the epigastric furrow and two in front of the spinnerets. Abdomen clothed with shorter gray hairs and longer, more sparse setae of brownish color. Younger and freshly molted females are light colored, with distinct markings like those of the males, a similar red color often showing on the abdomen.

Abdomen elongate oval. Femora of legs armed beneath with two widely-separated series of spines, the spines of these series on the anterior legs shorter and more slender than those of the anterior and caudal surfaces, and the spines of the anterior row more numerous than those of the caudal. Scape of epigynum geniculate at the beginning of the distal "spoon," the proximal division long, in profile a little curved, much as in *vertebrata*. In ventral view the scape is seen to be narrow, not at all or but weakly clavately expanding, not conspicuously so as it does in the other species, and it does not show the lateral lobes or tubercles at the sides of the main process. See figs. 1 and 2.



1 2

Neoscona salaeria sp. nov. ♀

Fig. 1. Ventral view, and Fig. 2. Lateral view of epigynum. (Setae not represented.)

♂.—In general obviously lighter in color than the female. Carapace fulvous to brown, with a median longitudinal line and a broader band above the lateral border on each side from choclate-colored to black. Sternum as in the female. Legs fulvous or brown, each tibia with a broad black annulus at each end and the metatarsus with a narrow annulus at proximal end and a broader and more distinct one near middle and at distal end, of which commonly only the distal one is distinct. Tarsi darker distally. Legs darkening and the annulations becoming more obscure in older specimens, and brighter and more strongly marked in newly-molted ones. Abdomen with the same coloration as in the female but the yellow pattern typically more strongly developed. Often the light markings of the dorsum of the abdomen are bright red in whole or in part instead of yellow. The yellow spots on the venter often connected along each side.

Ventral spines of femora of legs more strongly developed than in the female. Tibia of second legs beneath with the usual two stout basal spines, with no group of smaller ones distad of them such as found in *oaxacensis;* on the anterior face a double and in part triple series of short stout spines which are typically from thirty to forty in number. Coxae of fourth legs each with a prominent conical apophysis beneath. Coxae of first legs with the usual chitinous hook. The median apophysis (clavis) of the bulb of the male palpus formed almost exactly as in *vertebrata*, the larger lobe not expanded at all distally.

♂.—Length to 14 mm. Length of cephalothorax 7 mm.; width 6 mm. Length of tib. + pat. I, 11 mm.; of tib. + pat. IV 9.2 mm.

♀.—Length to 15 mm. Length of cephalothorax 7.4 mm.; width 6.2 mm. Length of tib. + pat. I 10.5 mm.; of tib. + pat. IV 10 mm.

Notes on Gonatopus ombrodes, a Parasite of Jassids (Hymen., Homop.)*

By C. N. AINSLIE, U. S. Bureau of Entomology.

On July 10, 1910, in Fort Collins, Colorado, a jassid, a female *Cicadula 6-notata*, flew to a lamp by which the writer was seated and attracted attention by her peculiar behavior. She seemed deformed, walked jerkily and was continually flipping her wings. A lens disclosed a small striped sac projecting from or attached to the abdomen between the fourth and fifth segments. This jassid was captured and mounted in balsam for future study.

Since that date a number of leaf hoppers aflicted in a similar manner have been taken in various parts of the middle west and a few adult parasites have been reared from these. The object of the present paper is to offer some facts that have been gathered regarding the habits of these parasites.

The writer is indebted to Mr. S. A. Rohwer, a systematist of the Bureau of Entomology, for a determination of the parasite and for helpful criticisms of this paper, and to Mr. D. M. DeLong of Harrisburg, Pennsylvania, who kindly determined the jassid hosts concerned in this study.

It may be said at the outset that while this parasite may possibly attack jassids more or less promiscuously, regard-

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less of species, no case has come under the observation of the writer in which any other species of jassid than this particular *Cicadula* has been taken with the sac of *Gonatopus ombrodes* attached. Perkins records *G. ombrodes* as reared from *Deltocephalus sp.* at Columbus, Ohio. Farther than this, no data are at present available to the writer regarding the range of victims attacked by this parasite.

The sub-family Dryininae, or Anteoninae, to which the parasite under consideration belongs, is a most interesting Mutilloid group of the Proctotrypidae. This group, recently has been most admirably treated both from a taxonomic and biologic point of view by Mr. F. A. Fenton.* Its members confine their attacks to certain homopterous insects belonging to the Fulgoridae, Jassidae and Membracidae. In most cases the larvae of these parasites live partly within the body of the host and partly within felt-like sacs that project between the abdominal plates of their victims. One most peculiar feature of this group of parasites is the chelate anterior tarsi with which the females of nearly all the species are armed, a character which, according to Ashmead, is found nowhere else among the Hymenoptera. This bit of apparatus, which closely resembles the finger and thumb of man or the opposing claws of raptorial birds, only much more viciously hooked and spined, proves a most successful and formidable weapon when employed in the capture of prey. And it must be borne in mind that this grasping appendage is supplemented by lightning-like activity on the part of its owner, making her more than a match for even the nimble jassids.

Comparatively little attention seems to have been given to this group of insects until recently. In Europe certain species have been given detailed study.

It is not an uncommon thing to find a *Cicadula* carrying two dryinid sacs, one on each side, attached to its abdomen. Usually these sacs are of equal size, indicating that the two eggs were deposited during the same attack. Occasionally one sac is noticeably larger than the other. More than two

*The Ohio Journal of Science, Vol. XVIII, pp. 177, 243 and 285. Numerous figures.

have never been found by the writer on a single individual of this species. It is more than probable that in such cases of double infestation one or both of the guests must perish, since it would be manifestly impossible for one small jassid to afford nourishment sufficient to carry two equally rapacious larvae to maturity. The survival of one larva in such a case would perhaps account satisfactorily for the disappearance of the other.

The dryinid sac referred to throughout this paper is rather short oval in form, is usually quite symmetrical and when mature measures about one millimeter in its major axis, the minor axis a trifle less. It is light brown in color and is barred transversely by several, three to five, narrow bands of darker brown that give it the appearance of having true segments. It has a dull surface, finely rugulose, projects from behind the second, third or fourth abdominal segment and is found most often on the left side of the abdomen although they occur on either side.

Adult *G. ombrodes* have been both reared and taken with a net. Only a few have been captured in the open and these on lawns where parasitized jassids abounded. It is probable that their activity and watchfulness would ordinarily forbid capture in the open, since they would naturally escape by falling to the ground on any sign of disturbance such as would be produced by the approach of a sweep net. Males are very uncommon and the females must outnumber them at least ten to one, judging from rearing results obtained by the writer.

It has been learned during these studies that in every case it appears to be the female jassids that fall victims to the attacks of the *ombrodes*. This may be due in some measure to the superior agility of the male jassids in eluding the spring of the parasite or because the females, being generally larger, are preferred as hosts because more likely to successfully nourish the young larvae. Nymphs so far as known are free from attack, since only adult females have been taken carrying the sacs.

These parasites are rare during the early summer and only begin to multiply towards autumn. They are seldom seen

before July. One parasitized jassid was taken by the writer June 1, 1915, the earliest date recorded during these observations.

Only the mature larval and the adult stages of the parasite are treated in this paper, since opportunities to acquire information regarding the appearance of the egg, time of incubation and the various instars of the insect have been impossible during the progress of fragmentary studies.

Emergence of the Larva.

August 6, 1914, a series of infested *Cicadula 6-notata*, all females, was captured and placed in a large tube vial with a supply of fresh grass blades. Only those were chosen that bore well-matured sacs as very poor success had been previously had in rearing parasitic larvae in captivity. Even when well supplied with abundant food the jassids would frequently die in the course of a few hours when confined in a cage, and when taken with small sacs would never survive to their maturity.

From this lot thus caged a number of dryinid larvae issued during the first day, wandered a while about the containing vial and finally established themselves on grass blades or in corners where they constructed cocoons. In order to secure more definite data, two jassids with single sacs in an advanced stage were then selected and placed in small shell vials with bits of fresh grass. These vials were kept under constant observation under a binocular with thirty diameter power.

For an hour or more these jassids were very uneasy, constantly on the move, flipping their wings and continually trying to disengage the sacs by kicking at them with their spiny hind tibiae. This nervousness becomes more pronounced as the parasitic larva nears maturity as jassids with small sacs seldom manifest distress in any manner.

At 10 a. m. a perpendicular rent or slit was noticed in the sac attached to one of these prisoners, and the white body of the larva in violent agitation was visible through this rupture. The opening was in the rear or pouch-like end of the sac, at right angles to the brown bands and was plainly

the result of the muscular contortions of the larva within. The membrane composing the sac seemed very tough and leathery but gave way slowly to the compelling force inside. When the delivery first began the jassid seized a grass blade firmly with its feet but soon let go and raced down the tube. It then forced its beak into another blade and with its claws took a firm grip that was never relaxed until death came nearly three hours later. In every case where an emergence has been witnessed, the host has always died during the final act, when the larva leaves its victim. And in each instance life continues with strange persistence to the very farewell move of the destroyer.

The struggles of the larva for freedom continued without cessation for an hour. At 12:15 it became quiet for thirty minutes, possibly for rest, withdrew into the host's body and the rent in the sac nearly closed. At intervals now the jassid moved its legs feebly. At 12:45 the larva again became active and for forty-five minutes labored most strenuously until it gained its entire freedom. Not all larvae are so fortunate for unless conditions are exactly right at this stage emergence is checked and death ensues.

The last few minutes were marked with extraordinary exertion. Peristaltic waves ran cephalad in rapid succession and each one served to propel the body an infinitesimal distance farther out. It will be understood that emergence was backward, for the tapering head was the last thing to appear. Even when finally free it seemed unwilling to leave its happy home for it remained for some little time thrusting its head again and again into the abdominal cavity of the jassid through the remains of the now much tattered sac. After about fifteen minutes of hesitation of this sort it moved away from the dead body of its host and began to travel.

The progress of the larva is peculiar. Its caudal end is first slightly advanced cephalad, then a constriction progresses anteriorly, this being followed in quick sequence by others, all this action tending to propulsion forward. Locomotion is certainly energetic even if not at all rapid.

(*To be Continued*)

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., JUNE, 1920.

Entomology in the United States National Museum.

The combined report of the Committee of the Entomological Society of America on Entomology in the National Museum and of the Museum Committee of the American Association of Economic Entomologists, by its publication in *Science* for March 5, 1920, and elsewhere, has now been before the entomological public for three months. Doubtless, entomologists approve the report. The proceedings of the St. Louis meeting (December 29 and 30, 1919) of the Entomological Society of America, at which the Committee made its report, have been published since the preceding number of the NEWS was closed for printing. Those proceedings state that the National Research Council was to "be informed of the [presumably entomological] needs of the National Museum and their consideration and support be urged." Although we have no hint as to the action that will be taken by the National Research Council, we look to it for a favorable report. The Council's support alone will hardly accomplish the desired results and we imagine that much individual work in gaining the attention and aid of Senators and Representatives will be necessary. To be most effective these efforts should be completely organized and systematized by the Society and the Association named above.

Notes and News

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

New Chief of Bureau in New Jersey.

We offer our congratulations to a valued contributor to the NEWS, Mr. Harry B. Weiss, who, on May 1, was appointed Chief of the Bureau of Statistics and Inspection in the New Jersey Department of Agriculture, to fill the vacancy caused by the death of Franklin Dye.

The Louisiana Entomological Society.

A note announcing the formation on March 5, at New Orleans, of a society under this name appeared in *Science* for April 16, 1920. It has a membership of about twenty-five and is domiciled at the Natural History Building of the Louisiana State Museum. The President is Edward Foster, the Secretary-Treasurer E. T. Holloway.

A New Variety of Lemonias (Lepidoptera).

Lemonias palmeri marginalis n. var.

The wings above have an orange marginal border about 1 mm. wide and the ground-color of the wings is lighter than in *palmeri* and the white spots contrast strongly with the background. This variety has quite a different facies from the species.

Type male and paratypes male and female from Acme, California, August 8, 1919 (Morgan Hebard). Types in the collection of The Academy of Natural Sciences of Philadelphia.—HENRY SKINNER.

Pamphila californica (Lepidoptera).

Pamphila californica Wright was described and figured in Wright's Butterflies of the West Coast, 1905, p. 241, pl. 31, f. 423, b, c. This is one of the numerous varieties of *Pamphila comma.*

Another *Pamphila californica* was previously described and it is a difficult one to make out from the description. The author of the species is P. Mabille, Bull. Comptes-Rendus, Soc. Ent. Belg. 1883, p. lxviii. This translation of the description will probably be of interest to the students of the Rhopalocera in California:

"*Pamphila californica* n sp.

Wings brownish, mixed with fulvous near the costa, with a thick oblique fuscous streak; end of cellule fuscous; fringe grayish. Wings beneath ochraceous.

"This species greatly resembles *P. linea* of Europe. Superiors brown, with bright fulvous spots on the costa and around a thick black streak running obliquely from the extremity of the cellule to the inner border.

"The end of the cellule is somewhat darker brown. Beneath, superiors ochraceous, with the middle of the disk brighter and the streak faintly reproduced. Inferiors ochraceous, one or two pale yellow dots faintly seen between the nervules. Underside of body yellow like the wings. One male from California."

Two new names are proposed by Mabille and Boullet for North American Hesperidae in the Bull Ent. Soc. France, 1917, page 100: *Pholisora pirus semicaeca* and *Hesperopsis arizonensis.* The former is described from one male from Utah, and the latter from one male from Arizona.

HENRY SKINNER.

A Rare Pamphlet (Hym., Lep., Neur.)

The Museum of Comparative Zoology has a copy of a reprint of an article which was to have been published in the Transactions of the Chicago Academy in 1870. But the big fire came and destroyed the stock, and few, possibly only this one, copy of the reprint was sent out. It is entitled "Notice of Hymenoptera and Nocturnal Lepidoptera collected in Alaska by W. H. Dall, Director Sci. Corps, W. U. T. Exp., by Dr. A. S. Packard, with a List of Neuroptera by P. R. Uhler and Dr. H. A. Hagen." Extract from Trans. Chicago Acad. Sci., vol. II, pp. 25–32, pl. 2. 1870.

In this article Packard describes *Vespa tripunctata* (p. 26), *Vespa alascensis* (p. 27), *Phragmatobia dallii* (p. 29) and *Gastropacha alascensis* (p. 29). Uhler describes *Perla* (*Nephelion*) *dallii* (p. 30) and Hagen *Cryptothrix insularis* (p. 31). Various described species are recorded. The plate figures *Bombus frigidus*, *B. occidentalis*, *B. flavifrons*, *B. lacustris*, *B. kirbyellus*, *B. nivalis*, *Vespa norvegica*, *V. arenaria*, *V. tripunctata*, *V. alascensis*, *Platarctia borealis*, *Arctia caja*, and *Phragmatobia dallii*. The new species have never been recorded in any catalogue, nor the paper referred to. Whether it can be considered as "published" depends, I suppose, on the existence of other copies. The "W. U. T. Exp." is the Western Union Telegraph Co. Expedition, and it was the expedition upon which Kennicott lost his life. Reports on the birds were published the preceding year, and Scudder noted the butterflies in Proc. Bost. Soc. Nat. Hist., in 1869.—Nathan Banks, Museum of Comparative Zoology, Cambridge, Mass.

Synonymy of Some Species of Thecla (Lepid.).

The following synonymy will be of interest to Lepidopterists. The first name has priority.

Thecla thordesca Hew.—*zenaida* Dyar.
" *elsa* Hew.—*primnoza* Dyar.
" *cambes* G. & S.—*syvix* Dyar.
" *philinna* Hew.—*greppa* Dyar.
" *uterkudante* Dr.—*elimes* Dyar.
" *bianca* Möschl.—*ostrinus* Druce.
" *proba* G. & S.—*climicles* Dyar.
" *xeneta* Hew.—*devia* Möschl.
" *atrox* Butl.—*gentilla* Schs.
" *canus* Druce.—*bunnirae* Dyar.
" *amphrade* Schs.—*posetta* Dyar.
" *autoclea* Hew.—*callides* Dyar.
" *serapio* G. & S.—*mesca* Dyar. ♀.
" *sabinus* Fldr.—*promissa* Möschl.
" *pan* Drury.—*tirrhaea* Möschl.
" *tella* Schs.—*castrena* Jones. ♀.

W. Schaus, U. S. National Museum, Washington, D. C.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in HEAVY-FACED TYPE refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are all grouped at the end of each Order of which they treat.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

2—Transactions of The American Entomological Society, Philadelphia. **4**—Canadian Entomologist, London, Canada. **5**—Psyche, Cambridge, Mass. **6**—Journal of the New York Entomological Society. **7**—Annals of The Entomological Society of America, Columbus, Ohio. **9**—The Entomologist, London. **10**—Proceedings of The Entomological Society of Washington, D. C. **13**—Journal of Entomology and Zoology, Claremont, Cal. **17**—Lepidoptera, Boston, Mass. **20**—Bulletin de la Societe Entomologique de France, Paris. **21**—The Entomologist's Record, London. **60**—Maine Agricultural Experiment Starion, Orono. **64**—Parasitology, London. **68**—Science, Lancaster, Pa. **88**—Occasional Papers of the Museum of Zoology, University of Michigan, Ann Arbor. **100**—Biological Bulletin of the Marine Biological Laboratory, Woods Hole, Mass. **107**—Rivista del Museo de la Plata, Buenos Aires. **108**—Journal of Genetics, Cambridge, England.

GENERAL. Hewitt, C. G.—Obituary notice. **4,** lii, 96. Bureau imperial d'entomologie. (Le Natural. Canadien, xlvi, 221–6.) **Holland, W. J.**—The development of entomology in North America. **7,** xiii, 1–15. **Holloway, T. E.**—The Louisiana Entomological Society. **68,** li, 386–7. **Johnson, H. L.**—Methods of mounting insects. **17,** iv, 22–3 (cont.). **La, P.**—Le temps et les insectes. (Rev. Scient., 1920, 24.) **Maheux, G.**—Le Docteur Hewitt. (Le Nat. Canadien, xlvi, 195–199.) **Metcalf & Osborn.**—Some observations on insects of the between tide zone of the North Carolina coast. **7,** xiii, 108–20. **Stone, W.**—The use and abuse of the genus. **68,** li, 427–9.

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xiii, 70–4. **Williamson, E. B.**—Notes on a few species of Progomphus. **88,** No. 77.

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Alexander, C. P.—Two undescribed Pediciine crane flies from the United States. **4,** lii, 78–80. **Banks, N.**—Descriptions of a few new Diptera. **4,** lii, 65–7. **Bequaert, J.**—A new nemestrinid fly from central Texas. **6,** xxvii, 301–7. **Cresson, E. T., Jr.**—A revision of the Nearctic Sciomyzidae. **2,** xlvi, 27–89. **Felt, E. P.**—New gall midges or Itonididae from the Adirondacks. **6,** xxvii, 277–92. **Johnson, C. W.**—A revision of the species of the genus Loxocera, with a description of a new allied genus and a new sp. **5,** xxvii, 15–19. **Parker, R. R.**—Another new sp. of Sarcophaga from Niagara Falls. **6,** xxvii, 265–7.

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Obituary

The *State Gazette* of Trenton, New Jersey, for April 19, 1920, recorded the death of FRANKLIN DYE on April 18, at Trenton, at the age of 84 years, after a brief illness. A very good account was given in this paper, of Mr. Dye's activities and public services while secretary of the New Jersey State Board of Agriculture from 1887 to 1916. From 1916 until his death he was Chief of the Bureau of Statistics and Inspection in the New Jersey State Department of Agriculture. While secretary, Mr. Dye was responsible for the first official document on entomology published by the state of New Jersey. This appeared in the 15th Annual Report of the New Jersey State Board of Agriculture, 1887, pp. 485–535, and consisted of material taken from Riley's "General Truths in Applied Entomology," which Mr. Dye assembled as being of interest to New Jersey farmers and fruit growers. This account appeared under Prof. Riley's name. Late in 1887, the first state entomologist, Rev. George D. Hulst, was appointed. He resigned the following year, 1888, and was succeeded by Dr. John B. Smith during the same year. While Mr. Dye apparently published no papers on entomology, he was interested in its economic side and recognized its importance. During his long years of service he did all that he could to advance such work in New Jersey.

HARRY B. WEISS, New Brunswick, New Jersey.

EXCHANGES.

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

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